

Quiz:

- Scalars / Vectors
- Distance / Displacement
- Speed / Velocity
- Displacement vs Time Graphs

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- Scalar \rightarrow just magnitude
 - Vector \rightarrow magnitude and direction

Scalars

distance

speed

time

mass

Vectors

displacement

velocity

acceleration

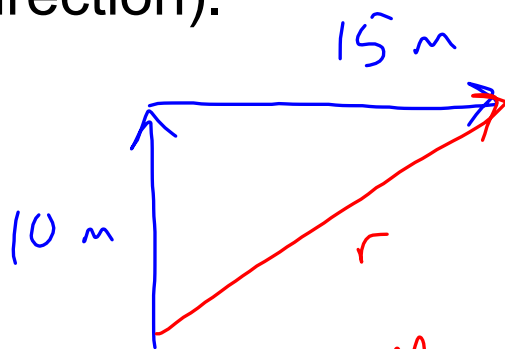
momentum

+/- for scalars \rightarrow increase or decrease

+/- for vectors \rightarrow direction

$$\begin{aligned} \rightarrow + \quad \vec{r} &= +15 \text{ m} \Rightarrow \text{Right} \\ \vec{r} &= -15 \text{ m} \Rightarrow \text{Left} \end{aligned}$$

A person walks 10 m north and then 15 m east. Find the resultant displacement (magnitude and direction).



Direction: Northeast

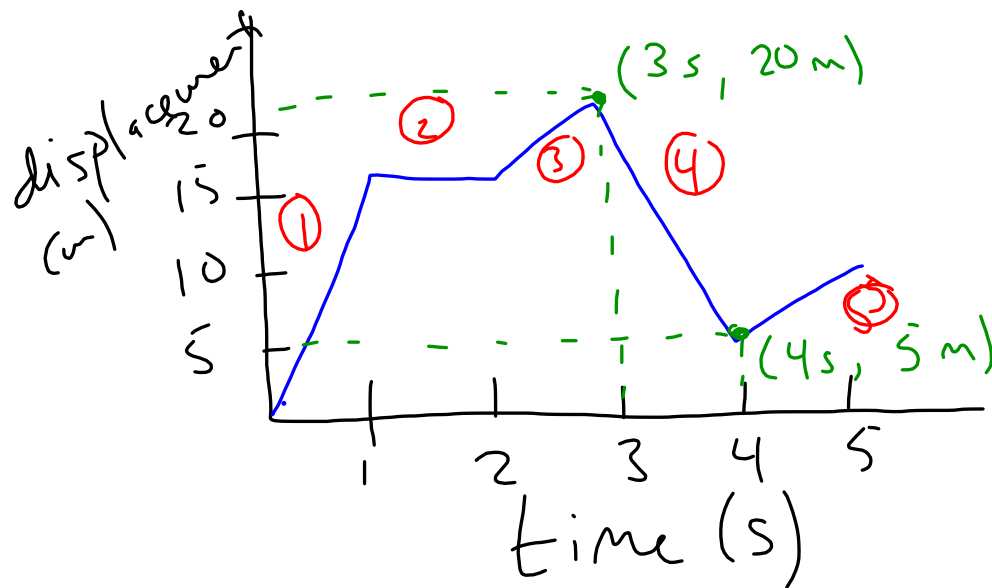
Magnitude:

$$a^2 + b^2 = r^2$$

$$r = \sqrt{a^2 + b^2}$$
$$= \sqrt{(10\text{ m})^2 + (15\text{ m})^2}$$

$$= 18.03\text{ m}$$

$$\vec{r} = 18.03\text{ m northeast}$$



$$\begin{aligned}
 v &= \frac{d_f - d_i}{t_f - t_i} \\
 &= \frac{5\text{ m} - 20\text{ m}}{4\text{ s} - 3\text{ s}} \\
 &= -15\text{ m/s}
 \end{aligned}$$

velocity vs. time graph:

$$\bar{a} = \frac{\bar{v}_f - \bar{v}_i}{t_f - t_i}$$

Momentum:

$$\overline{p} = m \overline{v}$$

$$\text{momentum} = (\text{mass}) (\overline{\text{velocity}})$$